Using the Teseo-LIV3F as an I2C Positioning Sensor

ADG/Positioning – May 14, 2018
The Teseo-LIV3F GNSS module embeds a 3rd generation of ST's single-die standalone positioning receiver ICs (Teseo III) able to work simultaneously on multiple constellations (GPS, GLONASS, Beidou, Galileo, QZSS).

The Teseo-LIV3F's I2C interface emits the same NMEA 0183-Rev.3.1 stream available on its UART interface.

The Host MCU should continuously poll the Teseo-LIV3F on I2C bus to access real-time positioning data.

Certain applications only need to read the current position on-demand (with no interest in the NMEA stream) using the Teseo-LIV3F as an I2C sensor (for example, as a gyroscope, accelerometer, etc.)
Proposal

• The Host could use the $PSTMNMEAREQUEST command to request on-demand only specific NMEA messages based on a message-list-bitmap:

$PSTMNMEAREQUEST,<msg-low>,<msg-high>*<checksum>

• Use case:
  • Host requests the required NMEA message;
  • Teseo-LIV3F responds with the requested NMEA message;
  • Host parses only the NMEA messages it wants when needed
Prepare the Teseo-LIV3F module

• Reset the I2C-MessageList
  • Send the commands:
    • $PSTMCFGMSGL,3,1,0,0
    • $PSTMSAVEPAR

• Disable echo-ing commands (CDB-ID 227[0])
  • $PSTMSETPAR,1227,1,2
  • $PSTMSAVEPAR

• Now the NMEA-Message-List on I2C port is empty; this means that:
  1. Teseo-LIV3F will not fill the I2C-buffer with an autonomous NMEA messages
  2. Teseo-LIV3F is still able to respond to NMEA command coming from Host
Prepare the STM32CubeMX Project [1/4]

Using the **STM32CubeMX** graphical software configuration tool to configure your application

Create a project on a **Nucleo-F401RE**:

1. Enable I2C-1 on PB9-PB8
2. Enable Blue-Button on PC13
3. Enable USART-2

![STM32CubeMX Configuration Diagram]
Prepare the STM32CubeMX Project [2/4]

3. Enable Blue-Button Interrupt (EXTI interrupt)
   A. Open Configuration Tab
   B. Press NVIC button
Prepare the STM32CubeMX Project [3/4]

3 Enable Blue-Button Interrupt (EXTI interrupt)
   
   C Enable EXTI IRQ handler
   
   D Press OK button
Prepare the STM32CubeMX Project [4/4]

4. Generate the C initialization code

Now you can open your IDE.
Edit the C-Code

1. Blue-button Call-back

2. I2C-Write to request the message

3. I2C-Read to read the message
Run and final conclusion

1. Run and view result on a terminal emulator

2. **Final conclusion:**

   The Host MCU doesn’t need to continuously pull the Teseo-LIV3F module

   The Host MCU can request any NMEA message it wants when needed

   The Host MCU has to parse only the needed NMEA message